

UNITED STATES PATENT OFFICE.

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ASSIGNORS TO FEDERAL REFINING COMPANY, OF JERSEY CITY, NEW
JERSEY, A CORPORATION OF NEW JERSEY.

INTERMEDIATE SUGAR PRODUCT.

SPECIFICATION forming part of Letters Patent No. 703,219, dated June 24, 1902.

Original application filed November 19, 1901, Serial No. 82,825. Divided and this application filed May 6, 1902. Serial
No. 106,110. (No specimens.)

To all whom it may concern:

Be it known that we, CLAUS A. SPRECKELS
and CHARLES A. KERN, citizens of the United
States of America, and residents of the bor-
5 ough of Manhattan, city and State of New
York, have invented a certain new and use-
ful Intermediate Sugar Product, of which the
following is a full and true description.

The object of our invention is to produce
10 an intermediate body which consists of a mass
of sugar mixed with a sulfonated or sulfo-
oleaginous defecating or cleansing agent.
For certain purposes the full amount of said
agent necessary to combine with the non-me-
15 chanical impurities of raw sugar may be left
admixed therewith for a time, but preferably
after mixing sugar and the agent the latter
is removed as far as practicable by means of
a centrifugal machine or other convenient
20 way, leaving mixed with the sugar in lieu of
the original non-mechanical impurities a
small amount of said cleansing agent. This
results in a diminution of the total volume
and weight of the original raw sugar by an
25 amount equal to the difference between said
non-mechanical impurities and the traces of
the cleansing agent, thereby saving freight
and storage expenses. As in keeping raw
sugar the presence of the non-mechanical im-
30 purities has a tendency progressively to di-
minish the amount of crystallized sugar which
can be obtained in subsequent refining, while
our sulfonated defecating agent has impor-
tant preserving properties, our new interme-
35 diate product, consisting of sugar mixed with
said sulfonated or sulfo-oleaginous defecat-
ing agent, has obvious and important advan-
tages.

The aim of our invention is the production,
40 with a view to storing or shipping, of an in-
termediate body consisting in its preferred
form of a mass of partly-purified sugar-crys-
tals from which substantially all of the sugar
impurities have been removed. As a conse-
45 quence of the removal of the sugar impuri-
ties referred to fewer or smaller receptacles
will be required, smaller warehouses may be
employed, the amount of handling and ship-
ping will be reduced, and the mass of sugar-

crystals is less liable to decompose or dete- 50
riorate in storage or transit.

In order to produce the intermediate bodies
constituting the subject-matter of our inven-
tion, as above stated, we employ a sulfonated
defecating or cleansing agent preferably pro- 55
duced as described in Letters Patent of the
United States No. 698,150, granted to us
April 22, 1902. As described in our said pat-
ent No. 698,150, we may prepare a sulfonated
or sulfo-oleaginous defecating or cleansing 60
agent in the following way: We mix sulfuric
acid, preferably of 1.835 specific gravity, (66°
Baumé,) or a mixture of acids containing sul-
furic acid in the proportion of, say, from
twenty to fifty parts, by weight, of the acid 65
or acid mixture, with one hundred parts, by
weight, of one or more bodies, of which resin-
ous bodies, (such as rosin-oil,) fats, fatty
oils and fatty acids, and essential oils (such
as commercial oil of turpentine) are generic 70
examples. The acid or acid mixture is added
to the bodies gradually, so as to maintain
a low temperature, and the mixture is al-
lowed to stand for a few hours. The ex-
cess of acid is removed or neutralized either 75
by the addition of alkali or by the addition
of water and gravital separation. For the
purpose of facilitating the removal of ex-
cess of acid and water a saline solution may
be added to the sulfonated body. The pro- 80
portion and strength of acid or acid mixture
in sulfonating the various resinous bodies
and fats, fatty oils, and fatty acids may be
one hundred parts of such ingredients to each
fifty parts of acid or acid mixture, and in the 85
case of essential oils the proportions may be
one hundred parts of the essential oil to each
twenty parts of the acid or acid mixture.
When the mixture is practically free from
water or from excess of alkali when used, we 90
may add thereto kerosene-oil or other hydro-
carbon-oil or a mixture containing hydrocar-
bon-oil. The proportion and strength of the
acid or acid mixture may, however, be va-
ried, provided the result is that the body 95
when acted upon by the sulfuric acid and
in the condition in which it is to be used
will not contain sulfuric acid in a form inju-

rious to the sugar and will have an affinity or absorbent property for the impurities greater than the adherent properties of such impurities for the sugar itself. As stated in
 5 our said patent, we may employ defecating or cleansing liquids composed of or containing sulfonated or sulpho - oleaginous bodies made by the subjection of mixtures of two or more resinous, fatty, or oily bodies to the ac-
 10 tion of sulfuric acid. We have obtained good results from a considerable number of such mixtures, of which the following may be cited as examples: first, rosin-oil, castor-oil, and oleic acid; second, castor-oil, cotton-
 15 seed oil, and oleic acid; third, lard and rosin oil; fourth, rosin-oil, oleic acid, and oil of turpentine; fifth, tallow and oil of turpentine. In another application, (of which our present application is a division,) Serial No. 82,825,
 20 filed November 19, 1901, we have particularly described the sulfonated or sulfo-oleaginous defecating or cleansing agents preferred by us and a method of producing the same. We add to the mass of sugar-
 25 crystals our defecating or cleansing liquid, which is non-solvent of sugar-crystals and which contains a sulfonated or sulfo-oleaginous defecating or cleansing agent produced as aforesaid, which liquid when mixed
 30 with the impure sugar or sugar-bearing material will so thoroughly absorb or act upon the impurities contained in the material treated as to take out and carry with it when removed from the treated mass substantially
 35 all of the said impurities.

The amount of the composition used may be varied to suit the different qualities of the material being treated; but the mass of sugar-bearing material and cleanser should be semi-
 40 fluid at least, if not already so. In all cases there should of course be enough to absorb out the impurities. For example, we have obtained excellent results when treating raw sugar by employing eight pounds of cleanser
 45 to each ten pounds of raw sugar. As the new defecating or cleansing liquid has no injurious effect upon the sugar-crystals, the quantity of such liquid may be increased as desired.

50 As pointed out in our Patent No. 700,099, granted May 13, 1902, one method of separating the defecating or cleansing liquid and ab-

sorbed impurities from sugar-crystals is as follows: After the intimate mixture of the said liquid and the material under treatment
 55 we preferably employ a mechanical device for purposes of separation. The mixture of the said cleansing or defecating liquid and the material being treated may be dumped into a rapidly-whirling centrifugal machine hav-
 60 ing a perforated basket of fine mesh, and we may subject the mixture to centrifugal action in this machine for, say, from one to five minutes, until the crystalline mass is considered to be thoroughly dried. The crystalline mass
 65 remaining in the centrifugal machine will be found to be substantially freed from the sugar impurities, but to bear slight traces of the cleansing composition employed and also to contain solid substances—such as sticks,
 70 stones, straws, fibers, &c.—of the original mass. The mixture of cleanser and impurities expelled from the centrifugal may be treated in any desired way for the recovery of the cleanser and utilization of the impurities. 75

At any time when it is desired to treat the intermediate product herein described in order to remove the remaining traces of the sulfonated or sulfo-oleaginous defecating or
 80 cleansing agent from the crystalline mass and to remove the solid impurities so as to obtain refined sugar we may employ any suitable process for filtering and recrystallization.

We claim—

1. The intermediate body, consisting of a
 85 mass of sugar-crystals mixed with a sulfonated defecating agent, substantially as described.

2. The intermediate body, consisting of a
 90 mass of sugar-crystals mixed with a sulfo-oleaginous defecating agent, substantially as described.

3. The intermediate body, consisting of a
 95 mass of sugar-crystals, substantially freed from sugar impurities, and mixed with a sulfonated defecating agent, substantially as described.

In witness whereof we have hereunto signed our names this 3d day of May, 1902.

CLAUS A. SPRECKELS.

CHARLES A. KERN.

In presence of—

JOHN P. DONOHUE,

LAURETTA T. NEVIN.